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**Article of jewellery with an element of ornamentation and a method and a tool for manufacturing such an article of jewellery**

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**Description**

The invention relates to an article of jewellery, in a body of which an opening is provided in which an element of ornamentation is accommodated, in particular a precious stone or an ornamenting stone, wherein in said opening of said body of said article of jewellery accommodating said element of ornamentation a support for said element of ornamentation is formed by which the depth of insertion of said element of ornamentation in said opening of said body of said article of jewellery is defined and by which a lower edge of said element of ornamentation is supported at least selectively, wherein said article of jewellery comprises a securing element extending at least along a part of the circumference of said opening, and a method for manufacturing such an article of jewellery, in particular a ring, in a body of which an opening is provided in which an element of ornamentation is accommodated, in particular a precious stone or an ornamenting stone, wherein said opening provided in said body of said article of jewellery after a first step of said method has a diameter which is smaller than a diameter of said element of ornamentation to be inserted into said opening, wherein in a subsequent step an

upper portion of said opening is formed with a diameter which is equal to or larger than said diameter of said element of ornamentation, so that between said upper portion of said opening with said diameter and a lower portion of said opening with said smaller diameter a transition portion serving as a support for said element of ornamentation is formed, that said element of ornamentation is inserted into said opening and set onto said support, whereby in a subsequent step the material of said body of said piece of jewellery is eroded in an area surrounding said opening and that said eroded material is brought to said element of ornamentation accommodated in said opening of said body, and a tool particularly suited for the implementation of said method.

Articles of jewellery wherein an element of ornamentation, in particular a precious stone, is accommodated in an opening are known. A disadvantage of the known articles of jewellery is that the element of ornamentation is mostly disposed just at the surface of the body of the piece of jewellery such that the element of ornamentation accommodated in the body of the piece of jewellery does not exhibit a spatial appearance and generally is observed as a flat ornamentation.

From GB 20849855 an article of jewellery and a method of the above mentioned kind are known. The viewer of an article of jewellery manufactured according to the known method should get the impression that the element of ornamentation inserted into the opening of the body of the article of jewellery - by means of an appropriate design of the area of the body of the article of jewellery surrounding the article of jewellery with facets - exhibits a higher optical presence than it would be the case without the afore mentioned design. Hence, by the method described, the illusion of a larger, optically more present element of ornamentation should be evoked. For this purpose, the British document suggests that for manufacturing the facets, the body of the article of jewellery is fixed in a press comprising a facetting punch and a press bed acting against it. In order to fix the article of jewellery in position in the press it is provided that the body of the article of jewellery at its face opposite to the opening has a circular groove concentric with the opening and cooperating with ribs of the of the press bed. Then a press force acts upon the facetting punch and cold-works the material of the body of the article of jewellery

surrounding the opening in such a way that a force directed towards the element of ornamentation accommodated in the opening acts upon this material. In this way this material is displaced towards the element of ornamentation and forms a securing element for the piece of jewellery.

With other articles of jewellery wherein the element of ornamentation is provided in the opening of the body of the article of jewellery more deeply, the disadvantage occurs that the article of jewellery has to be fixed in the opening by a procedure of sticking. This proceeding has the disadvantage that especially in case of a precious stone the element of ornamentation can be damaged by the glue used or, in case of a "gentle sticking", is secured in the opening of the body only unsafely, which particularly is disadvantageous if an expensive precious stone is used as an element of ornamentation.

It is the objective of the present invention to develop further an article of jewellery of the above mentioned kind in a way that, even if the element of ornamentation is accommodated in the opening of the body not just superficially, an improved support and an improved optical presence is ensured, and to create a method for manufacturing such an article of jewellery and a tool particularly suited for the implementation of the method.

This objective is achieved by the article of jewellery according to the invention by means that said securing element is formed by reaming said opening of said body of said article of jewellery in an area surrounding said opening and subsequently stabilising the material which was eroded from said area surrounding said opening of said body, and that said securing element acts upon an upper edge of said element of ornamentation at least selectively and that said area surrounding said opening of said body of said article of jewellery is at least partially bevelled.

An advantageous development of the invention provides that said securing element is formed extending substantially along the whole circumference of said opening. Such a measure has the advantage that therewith a particularly safe

support of said element of ornamentation is formed in the opening of said body of said article of jewellery.

The method according to the invention provides that the erosion of material in said area surrounding said opening is executed by reaming said area surrounding said opening and that a securing element for said element of ornamentation is formed from the such eroded material, such that an upper edge of the element of ornamentation is acted upon at least selectively by said such formed securing element and in this way said element of ornamentation is fixed in position in said opening.

An advantageous further development of the method according to the invention provides that said securing element is formed extending substantially along said whole circumference of said opening of said article of jewellery. Such implementation of said method has the advantage that therewith a particularly safe support of said element of ornamentation is achieved in said opening. A further advantageous development of the method according to the invention provides that a means for protection against twisting, especially a seat, is formed for at least one corner of said element of ornamentation.

A tool particularly suited for manufacturing the piece of jewellery according to the invention excels in that it comprises a cylindrical or conical tool body with at least one reaming element disposed at its front portion which has a reaming area extending inclined to the outer surface of said tool body, wherein said tool body comprises an opening for the reception of said element of ornamentation.

By the measures according to the invention in an advantageous way an article of jewellery, a method particularly advantageous for its manufacturing and a tool suited in particular for the implementation of said method are created, wherein said article of jewellery according to the invention has the advantage that a safe support for said element of ornamentation inserted into said opening of said body of said article of jewellery not just superficially is provided in said opening, too. Another advantage of the countersunk kind of setting of said element of ornamentation

rendered possible by the measures according to the invention is that a surface of said piece of jewellery can be treated (grinded, polished, lapidated, etc.) without any problems and without damaging said element of ornamentation accommodated in said opening of said article of jewellery or said element of ornamentation accommodated in said opening of said article of jewellery disturbing the procedure of treatment.

Another advantage of the measures according to the invention is that by the erosion of the material of said body of said article of jewellery in said area surrounding said opening with a reaming tool an improved optical presence of said element of ornamentation accommodated in said opening is given. Furthermore it is an advantage of the invention that the described method is not limited to a special form of said element of ornamentation. The method according to the invention rather permits safely inserting elements of ornamentation with a plurality of different cuts into an essentially circular opening.

Further advantageous developments of the invention are the subject-matter of the dependent claims.

Further details and advantages of the present invention are given in the embodiment described in the following with regard to the figures. It shows:

Figure 1: an embodiment of an article of jewellery,

Figure 2: a top plan view of the embodiment of figure 1,

Figure 3: a cross section along the line III-III of figure 1,

Figure 4a-4e: a schematic view of an embodiment of a method for manufacturing the piece of jewellery, and

Figure 5: an embodiment of a tool in particular suited for the execution of the method

Figure 1 shows a section of an article of jewellery 1, in the case described a ring 1', comprising a body 2, in case of the ring 1' a ring bar, in the surface 3 of which there is at least one opening 4, in which an element of ornamentation 5 having a diameter D, is inserted. In the case described – as apparent in particular from figures 3 and 4a–4e – the opening 4 is a through bore, whereby it is also possible to form the opening 4 as a blind hole.

It is also possible that the article of jewellery 1 is not designed as a ring 1' but as a pendant, as jewellery for ears, als a link of a chain, etc. or as an element of ornamentation for a watch or a clock, for a watchband, etc. The term "article of jewellery" therefore has got to be understood in its broadest meaning and does not only comprise finished articles of jewellery but also parts of such items.

The element of ornamentation 5 preferably is a precious stone, but it is also possible to use an ornamenting stone or a respective element of decoration. Thus the term "element of ornamentation" also has got to be understood in its broadest meaning.

As it can be seen particularly from figure 1, in the described article of jewellery 1 the element of ornamentation 5 is provided in the body 2 of the article of jewellery 1 not just superficially, but the element of ornamentation 5 – as it can be seen in figure 3 – is provided at a distance from the surface 3 of the body 2 of the article of jewellery 1, i. e. countersunk.

In order to be able to safely secure the element of ornamentation 5 in the opening 4, which means to set the element of ornamentation 5 in the body 2, it is then provided that the opening 4 of the body 2 of the article of jewellery 1 is formed as it can be seen in figures 4a-4e:

As shown in figure 4a, in the first step the opening 4 which in the case described is formed as a through bore is applied to the body 2, whereby it is provided that the diameter of the opening 4 is smaller than the diameter D of the element of ornamentation 5. This easily results from a comparison of figures 4a and 4b.

In a subsequent step, schematically shown in figure 4b, an upper portion 4' of the opening 4 of the body 2 of the article of jewellery 1 is then enlarged, for example by counterboring or milling, to a diameter  $d'$ , which is at least equal to but preferably a little bit larger than the diameter  $D$  of the element of ornamentation 5 so that - as described later (see figure 4d) - the element of ornamentation 5 can be brought into the upper portion 4' of the opening 4.

A lower portion 4'' of the opening 4 is left unchanged, hence it still has a diameter  $d$ , so that between the lower portion 4'' with the diameter  $d$  and the upper portion 4' with the diameter  $d'$  a transition portion 6 is formed. Hereby it is preferred that this transition portion 6 is formed conically. Generally a step-like transition portion may be possible, too.

As it can be seen best in figure 4d, the transition portion 6 now forms a support 7 for the element of ornamentation 5 inserted into the opening 4, so that the element of ornamentation 5 hereby cannot be inserted into the opening 4 more deeply. The depth of localisation of the transition portion 6 in the opening 4 in the body 2 of the article of jewellery 1 therefore depends on the desired insertion depth of the element of ornamentation 5 in the opening 4. Depending on the form of the element of ornamentation 5 the support 7 thus supports a lower edge 5' of the element of ornamentation 5 at least selectively, but preferably entirely circumferentially, and in this way secures the element of ornamentation 5 in the opening 4 at its bottom.

Preferably it is then provided that in a subsequent step - as can be seen in figure 4c - a seat 8 is provided in the transition portion 6, acting as a protection against twisting of the element of ornamentation 5 is one of the subsequent steps. But it is also possible that, depending on the form of the element of ornamentation 5 and the execution of the subsequent steps the seat 8 may be omitted.

After the opening 4 has been formed as described above and the element of ornamentation 5 has been inserted into the opening 4 and set onto the support 7

formed by the transition portion 6, a securing element 10, which is a setting for the element of ornamentation 5 in the body 2 of the piece of jewellery 1, is now formed, as it can be seen in figures 4d and 4e, fixing in position the element of ornamentation 5 into an upward direction with this securing element 10 acting upon an upper edge 5" of the element of ornamentation 5. In the step shown in figure 4d, the material of the body 2 of the article of jewellery is acted upon in an area 11 surrounding the opening by reaming it with an appropriate tool W, preferably the one shown in figure 5 and described later.

This erosion of material is preferably executed by a procedure of reaming, so that the material of the body 2 eroded from the area 11 is eroded by the reaming motion and is then transported towards the element of ornamentation 5 and is there restabilized. As can be seen especially in figure 3 and in figure 4, in this way the securing element 10 is formed by the material that has been eroded from the area 11 and restabilized directly adjacent to the element of ornamentation 5. By this securing element 10 the element of ornamentation 5 is secured in position in the opening 4 at least selectively. It is preferred that the securing element 10 is formed extending essentially or completely along the whole circumference of the opening 4. Then in an advantageous way a particularly safe support of the element of ornamentation 5 in the opening 4 is achieved. Hereby, in combination with the support 7, in an easy way a setting for the element of ornamentation 5 in the opening 4 of the body 2 of the article of jewellery 1 is achieved which provides for a reliable support of the element of ornamentation 5 in the opening 4.

As best is to be seen in figure 4e, by the above described erosion of material a conical form of the area 11 surrounding the opening 4 is achieved. This in an advantageous way results in that the element of ornamentation 5 - although it is accommodated deeply in the opening 4 - has an optically present appearance.

In figure 5 the tool W is shown in detail, which in figure 4d is described only schematically. The tool W comprises a tool body W1 which has an interior W2 wherein – as it can be seen in figure 4d - the element of ornamentation may be accommodated. At its front face W' the tool W comprises a reaming area W5



which is preferably divided into a plurality of segments W3 and which preferably is formed inclined to the outer surface of the tool body W1. A shank W6 starting at the tool body W1 permits a driven rotation of the tool W. The presented tool W is not only suitable for the implementation of the method described above. In an advantageous way it is also suitable for setting round stones according to common techniques, since such elements of ornamentation therewith may be reamed in more deeply than by means of conventional techniques, whereby the quality of this reaming procedure in comparison with known tools is enhanced by allowing to form the reaming boundary more broadly and more exactly than commonly is possible, which then also leads to an improvement of the optical appearance.